University of California
Lawrence Livermore National Laboratory

Director's Office

November 1995

UCRL-MI-121431-DO

# The Lawrence Livermore National Laboratory serves the nation through innovative science and technology

## Mission

As a multiprogram, multidisciplinary, national-security laboratory, the Lawrence Livermore National Laboratory focuses its talents and resources on:

- Stockpile stewardship and global security—reducing the nuclear danger.
- Energy and environment—balancing economic development and environmental protection.
- Bioscience—revolutionizing the understanding of human health.

## People and facilities

One of the largest research institutions in the world, Livermore's staff of some 7000 employees includes more than 2500 scientists and engineers and 2500 craftspeople and technicians. Its research complex includes lasers, supercomputers, accelerators, and hundreds of laboratories and test facilities. Through its long association with the University of California, Livermore has been able to recruit a world-class workforce and to establish an atmosphere of intellectual freedom and innovation, both of which are essential to sustained scientific and technological excellence.

## Programs and directorates

Livermore's programs derive from our core capabilities, building on discoveries and applying computer codes and technical innovations developed in the course of our national-security work. An infrastructure of disciplinary departments supports our programs and provides the foundation for our scientific and technical capabilities.

### Program Directorates

- Defense and Nuclear Technologies
- Nonproliferation, Arms Control, and International Security
- Lasers
- Energy
- Environmental Research
- Bioscience and Biotechnology Research

### Discipline Directorates

- Chemistry and Materials Science
- Physics and Space Technology
- Computations
- Engineering
- Plant Operations

## Benefits to the nation

Livermore's hallmark is the ability to translate basic science concepts into technologies that not only solve complex, real-world problems but also expand the boundaries of fundamental science. As a national-security laboratory, Livermore has essential responsibilities for ensuring the safety and reliability of the U.S. nuclear stockpile and the credibility of the U.S. nuclear deterrent.

We also apply Livermore's core capabilities, through multidisciplinary project teams, to other problems of national importance. We focus on projects that require a combination of capabilities unavailable elsewhere. The scientific breakthroughs and technical innovations made in these projects enhance our national-security work, and many find applications of direct public benefit. Examples include:

• **High-power lasers,** such as the Nova laser and the proposed National Ignition Facility, are used for unique weapons-physics experiments and for research leading to fusion energy production. Livermore's laser program has spurred major advances in the U.S. precision-optics industry.
• **Atomic vapor laser isotope separation (AVLIS);** uranium-AVLIS is in the process of commercialization and has the potential to help the U.S. retain and increase its major share of the multibillion-dollar-a-year global market in fuel for nuclear power plants.
• **Computer modeling codes, such as DYNA3D,** that dramatically cut the time and expense required to analyze the safety adequacy of structures and mechanical systems and to optimize the design of new products.
• **Digital mammography and computed tomography,** adaptations of advanced imaging and image-processing methods developed for nondestructive inspection of nuclear weapons, have the potential to greatly improve the diagnosis of breast cancer and other medical conditions.
• **Human genome, DNA repair, and food mutagen research,** all of which require a marriage of cutting-edge bioscience with the ultraprecise chemistry, high-performance computing, advanced instrumentation and engineering, and experimental facilities that were developed initially at Livermore for national-security work. These spinoff projects are revolutionizing the understanding of human health and health care.
• **Dynamic underground stripping , microbial filters,** and other innovative *in situ* environmental remediation technologies are increasing the speed and effectiveness and decreasing the cost of environmental cleanup.

## Contact

C. Bruce Tarter, Director, Lawrence Livermore National Laboratory;
Phone: (510) 422-4169; Fax: (510) 423-3597; E-mail: tarter@llnl.gov;
Web-site: http://www.llnl.gov

Work performed under the auspices of the U.S. Department of Energy by
Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.